Educating the Next Generation of Scientists and Engineers

In his 2006 State of the Union Address, President Bush announced the American Competitiveness Initiative (ACI) to ensure America continues to lead the world in research and development and so America remains at the forefront of scientific innovation. The ACI seeks to provide America's next generation of scientists, educators, and engineers with the strong math and science education necessary to compete in the 21st century marketplace. As part of a broader effort to encourage entrepreneurship and technological discovery, the ACI provides a substantial increase in funding for the Department of Energy's (DOE) Office of Science and its office of Workforce Development for Teachers and Scientists (WDTS).

WDTS has many national programs that support the next generation of scientists, engineers and science, technology, engineering and mathematics (STEM) educators. WDTS programs encourage students to pursue advanced science and mathematics courses and participate in a variety of special programs outside of their classrooms. WDTS national programs are run mainly through the Office of Science National Laboratories* science education offices, and also in close collaboration with the National Nuclear Security Administration and Office of Energy Efficiency and Renewable Energy's laboratories, when funding permits.
For more information: http://www.scied.science.doe.gov

Educational Events and Competitions for Middle and High School Students

The National Science Bowl®, for high school students is in its 16th year and has reached more than 100,000 students throughout the United States. More than 60 regional competitions take place across the country leading up to the National Finals held in Washington, DC. Students compete in a "Science Jeopardy" format, answering questions in all branches of science and mathematics. The educational event also includes scientific discovery sessions that mimic the process a real scientist would use to answer a question in subjects such as physics, chemistry, astronomy and biology. This exercise combines analysis with hands-on activities. Select teams also design and build hydrogen fuel cell vehicles. The regional and national events encourage student involvement in mathematics and science activities, improve awareness of career options in science and technology, and provide an avenue of enrichment and reward for academic science achievement. Program Manager: Sue-Ellen.Walbridge@science.doe.gov

The National Middle School Science Bowl encourages students to pursue science and mathematics at the most critical stage of their academic development. Students participate in an academic competition similar to "Science Jeopardy" and answer questions about mathematics, life and physical sciences. A discovery and hands-on engineering component engages students in designing, building, and racing model hydrogen fuel cell vehicles. Program Manager: Cindy.Musick@science.doe.gov

* Many of the National Laboratories have their own unique educational programs that are run locally or regionally, for information regarding these programs go to http://science.doe.gov/feature/WDTS-map/WDTS-map.htm . Information regarding the science done at each facility is also available from individual websites. For a link to a listing of these websites go to http://science.doe.gov/Sub/Organization/Map/national_labs_and_userfacilities.htm

Mentoring Programs for College Students

Each year more than 600 undergraduate students are paired with research scientists at the National Laboratories who serve as mentors in authentic research projects. Job skills training in topics such as technical writing and science presentation skills are also provided. To ensure the program is available to a national pool of applicants, selected participants receive funds for travel to and from the laboratories and a housing allowance in addition to their stipend. All participants write a research abstract that is published in the WDTS *Journal of Undergraduate Research*. Online copies of this journal are available from the website. The National Science Foundation (NSF) and the National Institutes of Health (NIH) partner with WDTS to help extend these opportunities to a wider audience of students.

University and community college students considering a career in science and/or engineering can spend the summer, spring or fall in the ***Student Undergraduate Laboratory Internship (SULI)*** program. Students work with scientists or engineers on projects related to the laboratories' research programs. This program helps students better understand the opportunities available to them in these fields. Program Manager: Sue-Ellen.Walbridge@science.doe.gov

Students from community colleges can participate in paid research internships in ***Science and Engineering and Technology*** at any of several different laboratories. Students work with scientists or engineers on projects related to the laboratories' research programs. They also attend career planning and training/informational sessions. This program is sponsored by The Community College Institute (CCI) of Science and Technology. Program Manager: Cindy.Musick@science.doe.gov

Research experience for undergraduate students who are preparing to become K-12 science, technology or math teachers is available through The ***Pre-Service Teacher Program (PST).*** Future teachers are paired with a master teacher and a laboratory scientist. The workshops for PST participants are designed to help the teachers provide resources and suggestions for translating their research experiences to the classroom. Program Manager: Cindy.Musick@science.doe.gov

Professional Development Opportunities for Teachers and Faculty

Potential K-12 teacher leaders, those with additional training who mentor and coach their peers, are supported through the ***Laboratory Science Teacher Professional Development Program (LSTPD)***. The program is designed based on the most current educational research to increase teacher content knowledge for those who wish to spur innovation in their schools. Teachers receive a stipend as well as mini-grant money for additional professional travel or training and supply money for their classroom. Program Manager: Todd.Clark@science.doe.gov

The Albert Einstein Distinguished Educator Fellowship Program was enacted by Congress in 1994 and is administered by the DOE with participation from other federal agencies, such as the NSF, National Aeronautics and Space Administration, NIH,

National Oceanographic and Atmospheric Administration, and National Institutes of Standards and Technology. This program brings teachers to Congress and appropriate federal agencies to provide the K- 12 educator's perspectives to policy makers and program managers of federal education programs. Program Manager: Cindy.Musick@science.doe.gov

Opportunities for undergraduate students and faculty to pursue cutting edge research are available through the ***Faculty and Student Teams (FaST***) program. Two or three undergraduate students from colleges and universities that receive below the 50th percentile in federal research funding, as well as institutions serving women and minorities underrepresented in the fields of science, engineering, and technology are eligible. The teams conduct cutting edge research as they partner with researchers at the laboratories. All faculty participants are required to write research grant proposals. The NSF partners with WDTS to help extend these opportunities to a wider audience of faculty.
Program Manager: Sue-Ellen.Walbridge@science.doe.gov

Full year sabbatical research opportunities for faculty members from Minority Serving Institutions are provided by ***The Faculty Sabbatical Fellowship***. The goal is to help these faculty members enhance their research capabilities as well as the research capacity of their home institutions. Each MSI faculty member works with a National Laboratory on a well-funded focused research project of the faculty member's choice and develops their abilities to apply for grants from the Office of Science and other granting institutions. Program Manager: Brian.O'Donnell@science.doe.gov

Excess laboratory equipment can be obtained by universities and colleges and other nonprofit educational institutions of higher learning in the United States from the ***Used Energy-Related Laboratory Equipment (ERLE***) Grant Program from the United States Department of Energy (DOE). The equipment is for use in energy oriented educational programs.
Program Manager: Sue-Ellen.Walbridge@science.doe.gov